

IN THE CLAIMS:

The following is a complete list of the claims now pending; this listing replaces all earlier versions and listings of the claims.

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Claim 1 (currently amended): A method of creating an image, said the image being formed by rendering at least a plurality of graphical objects to be composited according to a first hierarchical structure representing a compositing expression for said the image, said first the hierarchical structure including a plurality of nodes each representing at least a component one region of an object of said the image or an operation for combining sub-expressions of said the compositing expression, said method comprising the steps of:

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determining at least a portion of opacity information for at least one node of the hierarchical structure, the portion of opacity information simultaneously identifying each opaque region, transparent region and partially transparent region of at least one object represented by the node;

storing determining a second hierarchical structure region representation for the at least one node of said first hierarchical structure said second hierarchical structure based on the portion of opacity information associated with the node, the region representation indicating at least an unobscure one visible region of an the object associated with represented by the said node;

partitioning a space in which said the object is defined into a plurality of regions;

overlying the region representation ~~said second hierarchical structure~~ on ~~said~~ the partitioned object such that the partitioned ~~said~~ object is substantially encompassed within the region representation ~~said second hierarchical structure~~;

traversing ~~said overlaid~~ the overlaid region representation ~~second hierarchical structure~~ to identify any of ~~said~~ the plurality of regions of the partitioned object which include at least a portion of ~~said unobscured~~ the visible region; and

creating ~~said~~ the image by rendering ~~said~~ the identified regions.

Claim 2 (currently amended): The method according to claim 1, said method including the further step of traversing ~~said first~~ the hierarchical structure to detect ~~said~~ the node including the region representation ~~said second hierarchical structure~~.

Claim 3 (currently amended): The method according to claim 1, wherein ~~said second hierarchical structure~~ the region representation is traversed for each of ~~said~~ the plurality of regions of the partitioned object.

Claim 4 (currently amended): The method according to claim 1, said method including the further step of producing a map for ~~said~~ the plurality of regions, wherein ~~said~~ the map at least indicates any region which includes at least a portion of ~~said unobscured~~ the visible region.

Claim 5 (currently amended): The method according to claim 4, wherein ~~said the~~ map includes a flag for each of ~~said the~~ regions which includes at least a portion of the visible region.

Claim 6 (currently amended): The method according to claim 4, wherein ~~said the~~ map is produced using run-length encoding.

Claim 7 (currently amended): The method according to claim 4, wherein ~~said the~~ map is traversed in a predetermined order to determine ~~said the~~ identified regions.

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Claim 8 (currently amended): The method according to claim 1, said method including the further step of converting ~~said first the~~ hierarchical structure into a right leaning hierarchical structure.

Claim 9 (currently amended): The method according to claim 1, wherein ~~said first the~~ hierarchical structure is a graphic object tree.

Claim 10 (currently amended): The method according to claim 1, wherein ~~said second hierarchical structure~~ the region representation is a quadtree.

Claim 11 (currently amended): A method of creating an image, ~~said the~~ image being formed by rendering at least a plurality of graphical objects to be composited according to a ~~first~~ hierarchical structure representing a compositing expression for ~~said the~~

image, ~~said first~~ the hierarchical structure including a plurality of nodes each representing at least one region of an object a component of said the image or an operation for combining sub-expressions of said the compositing expression, said method comprising the steps of:

determining at least a portion of opacity information for at least one node of the hierarchical structure, the portion of opacity information simultaneously identifying each opaque region, transparent region and partially transparent region of at least one object represented by the node;

storing determining a second hierarchical structure region representation for the at least one node of said first the hierarchical structure based on the portion of opacity information associated with the node, said second hierarchical structure the region representing indicating at least an unobscured one visible region of an the object represented by the associated with said node;

traversing said overlaid first the hierarchical structure to detect said the node including said second hierarchical structure the region representation;

partitioning a space in which said the object is defined into a plurality of regions upon detecting said the node;

overlaying said second hierarchical structure the region representation on said the partitioned object such that the partitioned said object is substantially encompassed within the region representation said second hierarchical structure;

traversing ~~said second hierarchical structure~~ the overlaid region representation to identify any of ~~said~~ the plurality of regions of the partitioned object which include at least a portion of ~~said unobscured~~ the visible region; and
creating ~~said~~ the image by rendering ~~said~~ the identified regions.

Claim 12 (currently amended): The method according to claim 11, wherein ~~said second hierarchical structure~~ the region representation is traversed for each of ~~said~~ the plurality of regions of the partitioned object.

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Claim 13 (currently amended): The method according to claim 11, said method including the further step of producing a map for ~~said~~ the plurality of regions, wherein ~~said~~ the map at least indicates any region which includes at least a portion of ~~said unobscured~~ visible the region.

Claim 14 (currently amended): The method according to claim ~~[[12]]~~ 13, wherein ~~said~~ the map includes a flag for each of ~~said~~ the regions which includes at least a portion of the visible region.

Claim 15 (currently amended): The method according to claim ~~[[12]]~~ 13, wherein ~~said~~ the map is produced using run-length encoding.

Claim 16 (currently amended): The method according to claim [[12]] 13, wherein ~~said~~ the map is traversed in a predetermined order to determine ~~said~~ the identified regions.

Claim 17 (currently amended): The method according to claim 11, said method including the further step of converting ~~said first~~ the hierarchical structure into a right leaning hierarchical structure.

Claim 18 (currently amended): The method according to claim 11, wherein ~~said first~~ the hierarchical structure is a graphic object tree.

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Claim 19 (currently amended): The method according to claim 11, wherein ~~said second hierarchical structure~~ the region representation is a quadtree.

Claim 20 (currently amended): An apparatus for creating an image, ~~said~~ the image being formed by rendering at least a plurality of graphical objects to be composited according to a ~~first~~ hierarchical structure representing a compositing expression for ~~said~~ the image, ~~said first~~ the hierarchical structure including a plurality of nodes each representing at least one region of an object ~~a component~~ of ~~said~~ the image or an operation for combining sub-expressions of ~~said~~ the compositing expression, said apparatus comprising:
opacity information means for determining at least a portion of
opacity information for at least one node of the hierarchical structure, the portion of opacity

information simultaneously, identifying each opaque region, transparent region and partially transparent region of at least one object represented by the node;

storage region representation determining means for storing
determining a second hierarchical structure region representation for the at least one node
of said first the hierarchical structure based on the portion of opacity information
associated with the node, said second hierarchical structure the region representation
indicating at least an unobscured one visible region of an the object represented by the
associated with said node;

partitioning means for partitioning a space in which said the object is
defined into a plurality of regions;

overlying means for overlying said second hierarchical structure
the region representation on said the partitioned object such that said the partitioned object
is substantially encompassed within said second hierarchical structure the region
representation;

traversing means for traversing said overlayed second hierarchical
the overlaid structure region representation to identify any of said the plurality of regions of
the partitioned object which include at least a portion of said unobscured the visible region;
and

image creating means for creating said the image by rendering said
the identified regions.

Claim 21 (currently amended): The apparatus according to claim 20, wherein said traversing means further traverses ~~said first~~ the hierarchical structure to detect ~~said the~~ node including ~~said second hierarchical structure~~ the region representation.

Claim 22 (currently amended): The apparatus according to claim 20, wherein ~~said second hierarchical structure~~ the region representation is traversed for each of said plurality of regions of the partitioned object.

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Claim 23 (currently amended): The apparatus according to claim 20, further comprising map producing means for producing a map for ~~said the~~ plurality of regions, wherein ~~said the~~ map at least indicates any region which includes at least a portion of ~~said unobscured~~ the visible region.

Claim 24 (currently amended): The apparatus according to claim 20, wherein ~~said first~~ the hierarchical structure is a graphic object tree.

Claim 25 (currently amended): The apparatus according to claim 20, wherein ~~said the region representation~~ second hierarchical structure is a quadtree.

Claim 26 (currently amended): An apparatus for creating an image, ~~said the~~ image being formed by rendering at least a plurality of graphical objects to be composited according to a ~~first~~ hierarchical structure representing a compositing expression for ~~said the~~ image, ~~said first~~ the hierarchical structure including a plurality of nodes each representing

at least a ~~component~~ one region of an object of said the image or an operation for combining sub-expressions of ~~said the~~ compositing expression, said apparatus comprising:

opacity information determining means for determining at least a portion of opacity information for at least one node of the hierarchical structure, the portion of opacity information simultaneously identifying each opaque region, transparent region and partially transparent region of at least one object represented the node;

storage region representation determining means for storing determining a second hierarchical structure region representation for at least one the node of said first the hierarchical structure based on the portion of opacity information associated with the node, the region representation said second hierarchical structure indicating at least an one unobscured visible region of an object represented by the associated with said node;

first traversing means for traversing said overlayed first the hierarchical structure to detect said the node including said second hierarchical structure the region representation;

partitioning means for partitioning a space in which said the object is defined into a plurality of regions upon detecting said the node;

overlaying means for overlaying said second hierarchical structure the region representation on said the partitioned object such that said the partitioned object is substantially encompassed within said second hierarchical structure the region representation;

second traversing means for traversing the overlaid region representation said second hierarchical structure to identify any of said the plurality of

regions of the partitioned object which included at least a portion of ~~said unobscured~~ the visible region; and

image creating means for creating ~~said~~ the image by rendering ~~said~~ the identified regions.

Claim 27 (currently amended): The apparatus according to claim 26, wherein ~~said second hierarchical structure~~ the region representation is traversed for each of ~~said~~ the plurality of regions.

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Claim 28 (currently amended): The apparatus according to claim 26, further including map producing means for producing a map for ~~said~~ the plurality of regions, wherein ~~said~~ the map at least indicates any region which includes at least a portion of ~~said unobscured~~ the visible region.

Claim 29 (currently amended): The apparatus according to claim 26, wherein ~~said first~~ the hierarchical structure is a graphic object tree.

Claim 30 (currently amended): The apparatus according to claim 26, wherein ~~said second hierarchical structure~~ the region representation is a quadtree.

Claim 31 (currently amended): A computer program for a computer comprising software code portions for performing a method of creating an image, ~~said~~ the image being formed by rendering at least a plurality of graphical objects to be composited

according to a ~~first~~ hierarchical structure representing a compositing expression for ~~said the~~ image, ~~said first the~~ hierarchical structure including a plurality of nodes each representing at least one region of an object component of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression, said program comprising:

code for determining at least a portion of opacity information for at least one node of the hierarchical structure, the portion of opacity information simultaneously identifying each opaque region, transparent region and partially transparent region of at least one object represented by the node;

code for ~~storing~~ determining a second hierarchical structure region representation for at least one the node of said first hierarchical structure based on the portion of opacity information associated with the node, said second hierarchical structure the region representation indicating at least an unobscure one visible region of an the object represented by the associated with said node;

code for partitioning a space in which said the object is defined into a plurality of regions;

code for overlaying said second hierarchical structure the region representation on said the partitioned object such that said the partitioned object is substantially encompassed within said second hierarchical structure the region representation;

code for traversing said overlaid second hierarchical structure the overlaid region representation to identify any of said the plurality of regions of the partitioned object which include at least a portion of said unobscured the visible region;

and

code for creating ~~said the~~ image by rendering ~~said the~~ identified regions.

Claim 32 (currently amended): A computer readable medium storing a computer program, wherein ~~said~~ computer program comprises software code portions for performing a method of creating an image, ~~said the~~ image being formed by rendering at least a plurality of graphical objects to be composited according to a ~~first~~ hierarchical structure representing a compositing expression for ~~said the~~ image, ~~said first~~ ~~the~~ hierarchical structure including a plurality of nodes each representing at least one region of an object ~~a component of said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression, said program comprising:

code for determining at least a portion of opacity information for at least one node of the hierarchical structure, the portion of opacity information simultaneously identifying each opaque region, transparent region and partially transparent region of at least one object represented by the node;

code for ~~storing~~ determining a ~~second hierarchical structure~~ region representation for at least one the node of ~~said first the~~ hierarchical structure based on the portion of opacity information associated with the node, ~~said second hierarchical structure~~ the region representation indicating at least an ~~unobscured~~ one visible region of an the object represented by the associated with said node;

code for traversing the hierarchical structure to detect the node including the region representation;

code for partitioning ~~a space in which said~~ the object is defined into a plurality of regions upon detecting the node;

code for overlaying ~~said second hierarchical structure~~ the region representation on ~~said~~ the partitioned object such that ~~said~~ the partitioned object is substantially encompassed within ~~said second hierarchical structure~~ the region representation;

code for traversing ~~said overlayed second hierarchical structure~~ the overlaid region representation to identify any of ~~said~~ the plurality of regions of the partitioned object which include at least a portion of ~~said unobscured~~ the visible region; and

code for creating ~~said~~ the image by rendering ~~said~~ the identified regions.

Claim 33 (currently amended): A method for ~~optimising~~ optimizing an expression tree, ~~said~~ the expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said~~ the tree representing at least ~~a component of said~~ one region of an object of the image or an operation for combining sub-expressions of ~~said~~ the compositing expression ~~and each node having a region of the image represented by said node, the~~ said method comprising the steps of:

~~performing a first traversal of said tree to determine~~ determining at least a portion of opacity information for at least one each node of ~~said~~ the tree, wherein ~~said~~ the portion of opacity information ~~represents combined opacity for a node based on~~

~~regions associated with the simultaneously identifying each opaque region, transparent region and partially transparent region represented by the node; and~~
~~optimising said optimizing the expression tree by performing a~~
~~second traversal of said tree to determine determining obscurance information for each at~~
~~least the node of said the tree using said the portion of opacity information associated with~~
~~the node, wherein said the obscurance information represents indicates at least an one~~
~~visible unobscured region associated with represented by the node.~~

Claim 34 (currently amended): The method according to claim 33, wherein
said the opacity information is represented by a first hierarchical structure.

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Claim 35 (currently amended): The method according to claim 33, wherein
said the obscurance information is represented by a second hierarchical structure.

Claim 36 (currently amended): The method according to claim 33, said
method comprising the further step of identifying nodes representing ~~having an associated~~
complex graphical object.

Claim 37 (original): The method according to claim 36, said method
comprising the further step of determining opacity information for each node identified.

Claim 38 (currently amended): The method according to any one of claim 37, wherein ~~said~~ the first hierarchical structure is dependent on ~~said~~ the opacity information.

Claim 39 (canceled)

Claim 40 (currently amended): The method according to claim ~~[[39]]~~ 33, wherein opacity information of a child node is at least propagated to a parent node associated with ~~said~~ the child node.

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Claim 41 (canceled)

Claim 42 (currently amended): The method according to claim ~~[[41]]~~ 33, wherein obscurance information of a parent node is at least propagated to a child node associated with ~~said~~ the parent node.

Claim 43 (currently amended): The method according to claim 34, wherein ~~said~~ the first hierarchical structure is dependent on an operation associated with a node for which ~~said~~ the first hierarchical structure is constructed.

Claim 44 (currently amended): The method according to claim 35, wherein ~~said~~ the second hierarchical structures for a node are constructed by combining any first hierarchical structures associated with the node.

Claim 45 (currently amended): The method according to claim 34, wherein each leaf node of ~~said the~~ first hierarchical structure is assigned a value depending on an opacity of a region associated with ~~said the~~ leaf node.

Claim 46 (currently amended): The method according to claim 33, said method including the further step of converting ~~said the~~ expression tree into a right leaning tree.

Claim 47 (currently amended): The method according to claim 34, wherein each node of ~~said the~~ first hierarchical structure comprises a pointer indicating children nodes associated with ~~said the~~ node.

Claim 48 (currently amended): The method according to claim 35, wherein ~~the said first and second hierarchical structures are quadrees~~ structure is a quadtree.

Claim 49 (currently amended): The method according to claim 33, wherein ~~said the~~ opacity information is represented by bounding boxes.

Claim 50 (currently amended): The method according to claim 33, wherein ~~said the~~ obscurance information is represented by bounding boxes.

Claim 51 (currently amended): A method for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for

compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said~~ the tree representing at least ~~a component~~ one region of an object of an operation for combining sub-expressions of ~~said~~ the compositing expression and ~~each said node having a region of the image represented by said node, the~~ said method comprising the steps of:

~~performing a first traversal of said tree to construct~~ determining a first hierarchical structure for ~~at least each operation~~ one node of ~~said~~ the tree, wherein ~~said~~ the first hierarchical structure simultaneously identifying each opaque region, transparent region and partially transparent region represented by the ~~represents combined opacity information for a node based on regions associated with the node; and~~

~~optimising said~~ optimizing the expression tree by ~~performing a second traversal of said tree to construct~~ determining a second hierarchical structure for ~~each~~ at least the node of ~~said~~ the tree using ~~said opacity information~~ the first hierarchical structure, wherein ~~said~~ the second hierarchical structure ~~represents~~ indicates at least an unobscured one visible region associated with the ~~represented by the~~ node.

Claim 52 (currently amended): A method for ~~optimising~~ optimizing an expression tree, ~~said~~ the expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said~~ the tree representing at least ~~a component~~ one region of an object of ~~said~~ the image or an operation for combining sub-expressions of ~~said~~ the compositing expression, ~~the~~ said method comprising the steps of:

~~performing a first traversal of said tree to identify nodes~~ identifying at least one node having an associated complex graphical object;

~~performing a second traversal of said tree to determine determining
opacity information for each node identified in said first traversal;~~

~~constructing determining a first hierarchical structure region
representation for the each node of said tree based on said the opacity information, wherein
said the first hierarchical structure represents combined opacity information for a node
based on regions associated with the region representation simultaneously identifying each
opaque region, transparent region and partially transparent region of at least one object
represented by the node; and~~

~~optimising said optimizing the expression tree by determining a
second region representation performing a third traversal of said tree to construct a second
hierarchical structure for the each node of said tree using the first region representation at
least one first hierarchical structure, wherein said second hierarchical structure represents
at least an unobscured region associated with the node, the second region representation
indicating at least one visible region of the object represented by the node.~~

Claim 53 (canceled)

Claim 54 (original): The method according to claim 52, wherein each node
having an associated complex graphical object is tagged.

Claim 55 (canceled)

Claim 56 (currently amended): The method according to claim ~~[[55]]~~ 52, wherein ~~said the~~ opacity information is propagated down ~~said the~~ tree.

Claim 57 (currently amended): The method according to claim 52, wherein a first ~~hierarchical structure~~ region representation of a child node is at least propagated to a parent node associated with ~~said the~~ child node.

Claim 58 (canceled)

Claim 59 (currently amended): The method according to claim ~~[[58]]~~ 52, wherein a second ~~hierarchical structure~~ region representation of a parent node is at least propagated to a child node associated with ~~said the~~ parent node.

Claim 60 (currently amended): The method according to claim 52, wherein ~~said first hierarchical structure~~ the first region representation is dependent on an operation associated with a node for which ~~said first hierarchical structure~~ the first region representation is ~~constructed~~ determined.

Claim 61 (currently amended): The method according to claim 52, wherein ~~said the second hierarchical structure~~ region representation for a node ~~are constructed~~ is determined by combining any first ~~hierarchical structures~~ region representations associated with the node.

Claim 62 (currently amended): The method according to claim 52, wherein each leaf node of ~~said the first hierarchical structure~~ region representation is assigned a value depending on an opacity of a region associated with ~~said the~~ leaf node.

Claim 63 (currently amended): The method according to claim 52, wherein each node of ~~said the first hierarchical structure~~ region representation comprises a pointer to indicate children nodes associated with ~~said the~~ node.

Claim 64 (currently amended): The method according to claim 52, wherein ~~said the first and second hierarchical structures~~ region representations are quadtrees.

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Claim 65 (currently amended): An apparatus for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said node of said the~~ tree representing at least ~~a component~~ one region of an object of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression ~~and each said node~~ having a region of the image represented by ~~said node, the said~~ apparatus comprising:

means for performing a first traversal of ~~said tree to determine~~ determining at least a portion of opacity information for each at least one node of said the tree, wherein ~~said the~~ opacity information represents combined opacity for a node based on ~~regions associated with the~~ simultaneously identifying each opaque region, transparent region and partially transparent region represented by the node; and

means for ~~optimising said~~ optimizing the expression tree by performing a second traversal of said tree to determine determining obscurance information for each at least the node of said the tree using said the portion of opacity information associated with the node, wherein said the obscurance information ~~represents~~ indicates at least ~~an unobscured~~ one visible region associated with the represented by the node.

Claim 66 (currently amended): The apparatus according to claim 65, wherein said the opacity information is represented by a first hierarchical structure.

Claim 67 (currently amended): The apparatus according to claim 65, wherein said the obscurance information is represented by a second hierarchical structure.

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Claim 68 (currently amended): The apparatus according to claim 65, said apparatus further comprising means for identifying nodes having an associated complex graphical object.

Claim 69 (currently amended): The apparatus according to claim 68, said method further comprising ~~the further step of~~ means for determining opacity information for each node identified.

Claim 70 (currently amended): The apparatus according to claim ~~[[65]]~~ 67, wherein said ~~first and the~~ second hierarchical ~~structures are quadtrees~~ structure is a quadtree.

Claim 71 (currently amended): The apparatus according to claim 65, wherein ~~said~~ the opacity information is represented by bounding boxes.

Claim 72 (currently amended): The apparatus according to claim 65, wherein ~~said~~ the obscurity information is represented by bounding boxes.

Claim 73 (currently amended): An apparatus for ~~optimising~~ optimizing an expression tree, ~~said~~ the expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said~~ the tree representing at least ~~a component~~ one region of an object of ~~said~~ the image or an operation for combining sub-expressions of ~~said~~ the compositing expression and ~~each said node~~ having ~~a region of the image represented by said node~~, the ~~said~~ apparatus comprising:

~~mean~~ means for performing a first traversal of said tree to construct determining a first hierarchical structure for ~~each operation~~ at least one node of ~~said~~ the tree, wherein ~~said~~ the first hierarchical structure represents combined opacity information for a node based on regions associated with the simultaneously identifying each opaque region, transparent region and partially transparent region represented by the node; and

~~mean~~ means for ~~optimising~~ optimizing the expression tree by performing a second traversal of said tree to construct determining a second hierarchical structure for ~~each~~ at least the node of ~~said~~ the tree using ~~said~~ opacity information the first hierarchical structure, wherein ~~said~~ the second hierarchical structure ~~represents~~ indicates at least ~~an unobscured~~ one visible region associated with the represented by the node.

Claim 74 (currently amended): An apparatus for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said node of said the~~ tree representing at least ~~a component~~ one region of an object of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression, ~~the said~~ apparatus comprising:

means for ~~performing a first traversal of said tree to~~ identifying at least one node ~~nodes~~ having an associated complex graphical object;

means for ~~performing a second traversal of said tree to determine~~ determining opacity information for ~~each the node identified in said first traversal;~~

means for ~~constructing~~ determining a first ~~hierarchical structure~~ region representation for ~~each the node of said tree based on said the~~ opacity information associated with the node, wherein ~~said the first hierarchical structure represents combined~~ opacity information for a node based on regions associated with the region representation simultaneously identifying opaque regions, transparent regions and partially transparent regions of at least one object represented by the node; and

means for ~~optimising said~~ optimizing the expression tree by determining a second region representation ~~performing a third traversal of said tree to~~ construct a second hierarchical structure for ~~each the node of said tree using at least one the~~ first ~~hierarchical structure~~ region representation, wherein ~~said the second hierarchical structure represents at least an unobscured region associated with the~~ region representation indicating at least one visible region of the object represented by the node.

Claim 75 (canceled)

Claim 76 (original): The apparatus according to claim 74, wherein each node having an associated complex graphical object is tagged.

Claim 77 (canceled)

Claim 78 (currently amended): A computer program for a computer comprising software code portions for performing a method for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said the~~ tree representing at least ~~a component of said one region of an object of the image or an operation for combining sub-expressions of said the compositing expression and each said node having a region of the image represented by said node, the said~~ one region of an object of the image or an operation for combining sub-expressions of said the compositing expression and each said node having a region of the image represented by said node, the said program comprising:

code for performing ~~a first traversal of said tree to determine~~ determining at least a portion of opacity information for each at least one node of said the tree, wherein the portion of opacity information represents combined opacity for a node ~~based on indicating simultaneously identifying each opaque region, transparent region and partially transparent region associated with the represented by the node; and~~

code for ~~optimising said~~ optimizing the expression tree by performing ~~a second traversal of said tree to determine~~ determining obscurance information for each at least the node of ~~said the~~ tree using ~~said the~~ opacity information, wherein ~~said~~

the obscurance information ~~represents~~ indicates at least ~~an unobscured~~ one visible region associated with the represented by the node.

Claim 79 (currently amended): A computer readable medium storing a computer program, wherein said computer program comprises software code portions for performing a method for ~~optimising~~ optimizing an expression tree, ~~said the~~ the expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said node of said the~~ tree representing at least ~~a component of said one~~ region of an object of the image or an operation for combining sub-expressions of ~~said the~~ the compositing expression and ~~each said node having a region of the image represented by said node, the said~~ program comprising:

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code for ~~performing a first traversal of said tree to determine~~ determining a first hierarchical structure ~~opacity information for at least one~~ each node of ~~said the~~ tree, wherein said ~~opacity information represents combined opacity for a node based on indicating regions associated with the first hierarchical structure simultaneously identifying each opaque region, transparent region and partially transparent region represented by the node; and~~

code for ~~optimising said~~ optimizing the expression tree by performing a second traversal of said tree to ~~determine obscurance information~~ determining a second hierarchical structure for ~~each at least the~~ each node of ~~said the~~ the tree using ~~said opacity information the first hierarchical structure, wherein said obscurance information represents the second hierarchical structure indicates~~ at least an obscured one visible region associated with represented by the node.

Claim 80 (currently amended): A method for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said the~~ tree representing at least ~~a component of said one region of an object of the image or an~~ operation for combining sub-expressions of ~~said the~~ compositing expression and ~~each said node having a region of the image represented by said node, the said~~ method comprising the steps of:

A1 performing a first traversal of said tree to determine opacity information determining a region representation for each at least one node of said the tree, wherein ~~said opacity information the region representation represents simultaneously~~ identifying each opaque region, transparent region and partially transparent region represented by the combined opacity information for a node based on regions associated with the node; and

optimising said optimizing the expression tree by performing a second traversal of said tree to determine determining compositing information for at least one the node of ~~said the~~ tree, wherein ~~said the~~ compositing information for a node is being determined using the region representation ~~opacity information~~ associated with the node, and wherein ~~said the~~ compositing information represents at least ~~obscured regions, load regions and regions~~ one visible region to be composited for an object associated with the node.

Claim 81 (currently amended): The method according to claim 80, wherein ~~said~~ the compositing information is represented by a first hierarchical structure.

Claim 82 (currently amended): The method according to claim 81, further comprising the step of identifying nodes of ~~said~~ the tree, for which a first hierarchical structure is required, depending on ~~opacity information~~ the region representation associated with the node.

Claim 83 (currently amended): The method according to claim 80, wherein ~~said opacity information comprises a~~ the region representation is one or more second hierarchical structure ~~structures representing an opacity of a region associated with a node.~~

Claim 84 (currently amended): The method according to claim 80, wherein ~~said opacity information~~ the region representation is a bounding box representing an opacity of a region associated with a node.

Claim 85 (currently amended): The method according to claim 81, wherein ~~said~~ the first hierarchical structure is dependent on ~~said opacity information~~ the region representation.

Claim 86 (canceled)

Claim 87 (currently amended): The method according to claim 83, wherein ~~opacity information~~ a region representation of a child node is at least propagated to a parent node associated with ~~said~~ the child node.

Claim 88 (currently amended): The method according to claim 87, wherein ~~opacity information~~ a region representation of ~~said~~ the parent node is determined by merging at least two second hierarchical structures.

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Claim 89 (currently amended): The method according to claim 87, wherein ~~opacity information~~ a region representation of ~~said~~ the parent node is determined by merging at least one second hierarchical structure and a bounding box.

Claim 90 (canceled)

Claim 91 (currently amended): The method according to claim ~~[[88]]~~ 81, wherein a first hierarchical structure of a parent node is at least propagated to a child node associated with ~~said~~ the parent node.

Claim 92 (currently amended): The method according to claim 83, wherein ~~said~~ the second hierarchical structure is dependent on an operation associated with a node for which ~~said~~ the first hierarchical structure is ~~constructed~~ determined.

Claim 93 (currently amended): The method according to claim 83, wherein each leaf node of ~~said~~ the second hierarchical structure is assigned a value depending on an opacity of a region associated with ~~said~~ the leaf node.

Claim 94 (currently amended): The method according to claim 83, wherein each node of ~~said~~ the second hierarchical structure comprises a pointer to indicate child nodes associated with ~~said~~ the node.

Claim 95 (currently amended): The method according to claim 83, wherein ~~said first and~~ the second hierarchical structures are quadtrees.

A. Claim 96 (currently amended): A method for ~~optimising~~ optimizing an expression tree, ~~said~~ the expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said~~ the tree representing at least ~~a component of said~~ one region of an object of the image or an operation for combining sub-expressions of ~~said~~ the compositing expression and ~~each said node having a region of the image represented by said node, the~~ said method comprising the steps of:

~~performing a first traversal of said tree to determine~~ determining at least a portion of opacity information for ~~each~~ at least one node of ~~said~~ the tree, wherein ~~said the portion of~~ opacity information simultaneously identifying each opaque region, each transparent region and each partially transparent represented by the ~~represents~~ combined opacity information for a node based on region associated with the node; and

~~optimising said optimizing the expression tree by performing a second traversal of said tree to construct determining a first hierarchical structure for at least one node of said the tree, wherein said the first hierarchical structure is constructed determined for a node using the opacity information associated with determined for the node, and wherein said first the hierarchical structure represents at least obscured visible regions, load regions and invisible regions to be composited, for an object associated with the node.~~

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Claim 97 (currently amended): A method for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said the~~ tree representing at least ~~a component~~ one region of an object of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression and ~~each said node~~ having a region of the image represented by ~~said node~~, the said method comprising the steps of:

~~performing a first traversal of said the tree to determine at least a portion of opacity information for each at least one node of said the tree, wherein said the portion of opacity information simultaneously identifying each opaque regions, transparent regions and partially transparent region represented by represents combined opacity information for a node based on regions associated with the node;~~

~~identifying nodes of said the tree, for which a first hierarchical structure compositing information is required, depending on the portion of opacity information associated with the node; and~~

~~optimising said optimizing the expression tree by performing a second traversal of said the tree to determine compositing information for each node of said the tree identified in said the first traversal, wherein said the compositing information is determined for a node using the portion of opacity information associated with determined for the node, and wherein said the compositing information represents indicates at least obscured invisible regions, load regions and visible regions to be composited for an object associated with represented by the node.~~

Claim 98 (currently amended): The method according to claim 97, wherein said the compositing information is represented by a first hierarchical structure.

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Claim 99 (currently amended): The method according to claim [[97]] 98, wherein said the opacity information comprises a second hierarchical structure representing an opacity of a region associated with a node.

Claim 100 (currently amended): The method according to claim 98, wherein said the opacity information comprises is represented by a bounding box representing an opacity of a region associated with a node.

Claim 101 (currently amended): The method according to claim 98, wherein said the first hierarchical structure is dependent on said the opacity information.

Claim 102 (currently amended): The method according to claim 97,
wherein ~~said~~ the first traversal is a bottom-up traversal.

Claim 103 (currently amended): The method according to claim 99,
wherein opacity information of a child node is at least propagated to a parent node
associated with ~~said~~ the child node.

Claim 104 (currently amended): The method according to claim 103,
wherein opacity information of ~~said~~ the parent node is determined by merging at least two
second hierarchical structures.

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Claim 105 (currently amended): The method according to claim 103,
wherein opacity information of ~~said~~ the parent node is determined by merging at least one
second hierarchical structure and a bounding box.

Claim 106 (currently amended): The method according to claim [[98]] 97,
wherein ~~said~~ the second traversal is a top-down traversal.

Claim 107 (currently amended): The method according to claim 106,
wherein a first hierarchical structure of a parent node is at least propagated to a child node
associated with ~~said~~ the parent node.

Claim 108 (currently amended): An apparatus for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said node of said the~~ tree representing at least ~~a component~~ one region of an object of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression ~~and each said node~~ having a region of the image represented by said node, the ~~said~~ apparatus comprising:

means for performing a first traversal of said tree to determine opacity information determining a region representation for ~~each at least one~~ node of ~~said the~~ tree, wherein said opacity information represents combined opacity information for a node based on regions associated with the region representation simultaneously identifying each opaque region, transparent region and partially transparent region represented by the node; and

means for ~~optimising~~ optimizing the expression tree by performing a second traversal of said tree to determine determining compositing information for at least one node of ~~said the~~ tree, wherein ~~said the~~ compositing information for a node is being determined using opacity information associated with the region representation determined for the node, and wherein ~~said the~~ compositing information represents at least ~~obsured regions, load regions and regions~~ one visible region to be composited for an object associated with the node.

Claim 109 (currently amended): The apparatus according to claim 108, wherein ~~said the~~ compositing information is represented by a first hierarchical structure.

Claim 110 (currently amended): The apparatus according to claim 109, further comprising means for identifying nodes of ~~said the~~ tree, for which a first hierarchical structural is required, depending on ~~opacity information~~ a region representation associated with the node.

Claim 111 (currently amended): The apparatus according to claim 108, wherein ~~said opacity information comprises a~~ the region representation is one or more second hierarchical ~~structure~~ structures representing an opacity of a region associated with the node.

A. Claim 112 (currently amended): The apparatus according to claim 108, wherein ~~said opacity information comprises~~ the region representation is a bounding box representing an opacity of a region associated with the node.

Claim 113 (currently amended): An apparatus ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said node of said the~~ tree representing at least ~~a component~~ one region of an object of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression ~~and each said node having a region of the image represented by said node, the~~ said apparatus comprising:

means for performing a first traversal of ~~said the~~ tree to determine at least a portion of opacity information for ~~each at least one~~ node of ~~said the~~ tree, wherein said the portion of opacity information simultaneously identifying each opaque region.

~~transparent region and partially transparent region represented by represents combined
opacity information for a node based on regions associated with the node; and~~

~~means for optimising said optimizing the expression tree by
performing a second traversal of said tree to construct determining a first hierarchical
structure for at least one node of said the tree, wherein said ~~first~~ the hierarchical structure is
constructed determined for a node using the portion of opacity information associated with
determined for the node, and wherein said ~~first~~ the hierarchical structure represents at least
~~obscured-invisible~~ regions, load regions and visible regions to be composited, for an object
associated with the node..~~

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Claim 114 (currently amended): An apparatus ~~optimising~~ optimizing an
expression tree, ~~said~~ the expression tree representing a compositing expression for
compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said~~ the tree
representing at least ~~a component~~ one region of an object of ~~said~~ the image or an operation
for combining sub-expressions of ~~said~~ the compositing expression and ~~each said node~~
having a region of the image represented by ~~said~~ node, ~~the~~ said apparatus comprising:

~~means for performing a first traversal of said the tree to determine at
least a portion of opacity information for ~~each at least one~~ node of ~~said~~ the tree, wherein
~~said~~ the opacity information simultaneously identifying each opaque region, transparent
region and partially transparent region represented by represents combined opacity
information for a node based on regions associated with the node;~~

means for identifying nodes of ~~said the~~ tree, for which a first hierarchical structure compositing information is required, depending on opacity information associated with the node; and

means for ~~optimising said~~ optimizing the expression tree by performing a second traversal of ~~said the~~ tree to determine compositing information for each node of ~~said the~~ tree identified in ~~said the~~ first traversal, wherein ~~said the~~ compositing information is determined for a node using the opacity information ~~associated with~~ determined for the node, and wherein ~~said the~~ compositing information represents at least obscured invisible regions, load regions and visible regions to be composited for an object associated with the node.

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Claim 115 (currently amended): A computer program for a computer comprising software code portions for performing a method for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said~~ node of ~~said the~~ tree representing at least a ~~component~~ one region of an object of ~~said the~~ image or an operation for combining sub-expressions of ~~said the~~ compositing expression and ~~each said node~~ having a region of the image represented by ~~said node~~, the said program comprising:

code for ~~performing a first traversal of said tree to determine~~ determining opacity information a region representation for ~~each at least one~~ node of ~~said the~~ tree, the region representation simultaneously identifying each opaque region, transparent region and partially transparent region represented by ~~wherein said opacity~~

information represents combined opacity information for a node based on regions associated with the node; and

code for ~~optimising said~~ optimizing the expression tree by performing a second traversal of said tree to determine determining compositing information for at least one node of ~~said the tree, wherein said the~~ compositing information for a node is being determined using the region representation determined for opacity information associated with the node, and wherein said the compositing information represents at least ~~obscured regions, load regions and regions~~ one visible region to be composited for an object associated with the node.

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Claim 116 (currently amended): A computer readable medium storing a computer program, wherein said computer program comprises software code portions for performing a method for ~~optimising~~ optimizing an expression tree, ~~said the~~ expression tree representing a compositing expression for compositing an image and comprising a plurality of nodes, each ~~said node of said the tree representing at least a component~~ one region of an object of said the image or an operation for combining sub-expressions of said the compositing expression and ~~each said node having a region of the image represented by said node, the~~ said program comprising:

code for performing a first traversal of ~~said the~~ tree to determine at least a portion of opacity information for ~~each~~ at least one node of ~~said the~~ tree, wherein ~~said the portion of~~ opacity information simultaneously identifying each opaque region, transparent region and partially transparent region represented by ~~represents combined~~ opacity information for a node based on regions associated with the node; and

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code for ~~optimising said~~ optimizing the expression tree by
performing a second traversal of said tree to determine compositing information
determining a hierarchical structure for at least one node of ~~said~~ the tree, wherein ~~said~~
compositing information the hierarchical structure for a node is determined using the
portion of opacity information ~~associated with~~ determined for the node, and wherein ~~said~~
compositing information the hierarchical structure represents at least ~~obscured~~ invisible
regions, load regions and visible regions to be composited for an object associated with the
node.
